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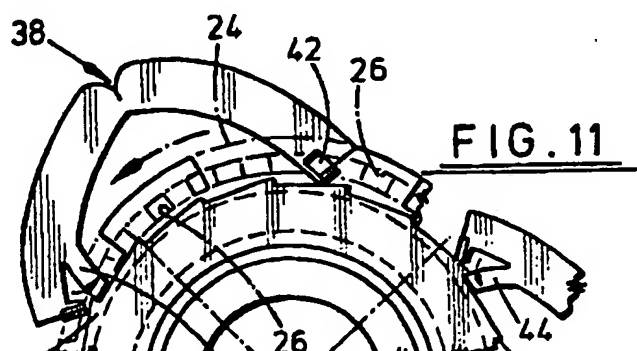
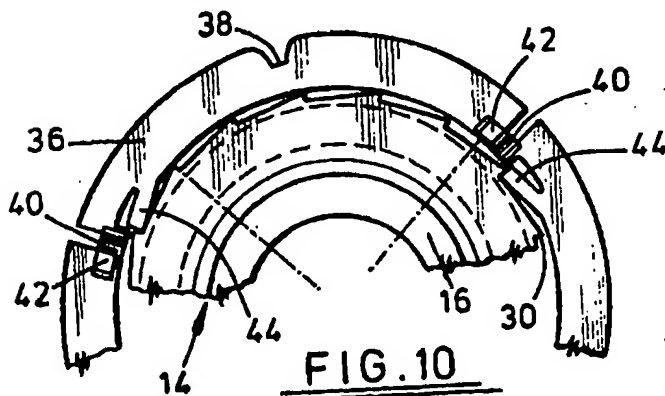
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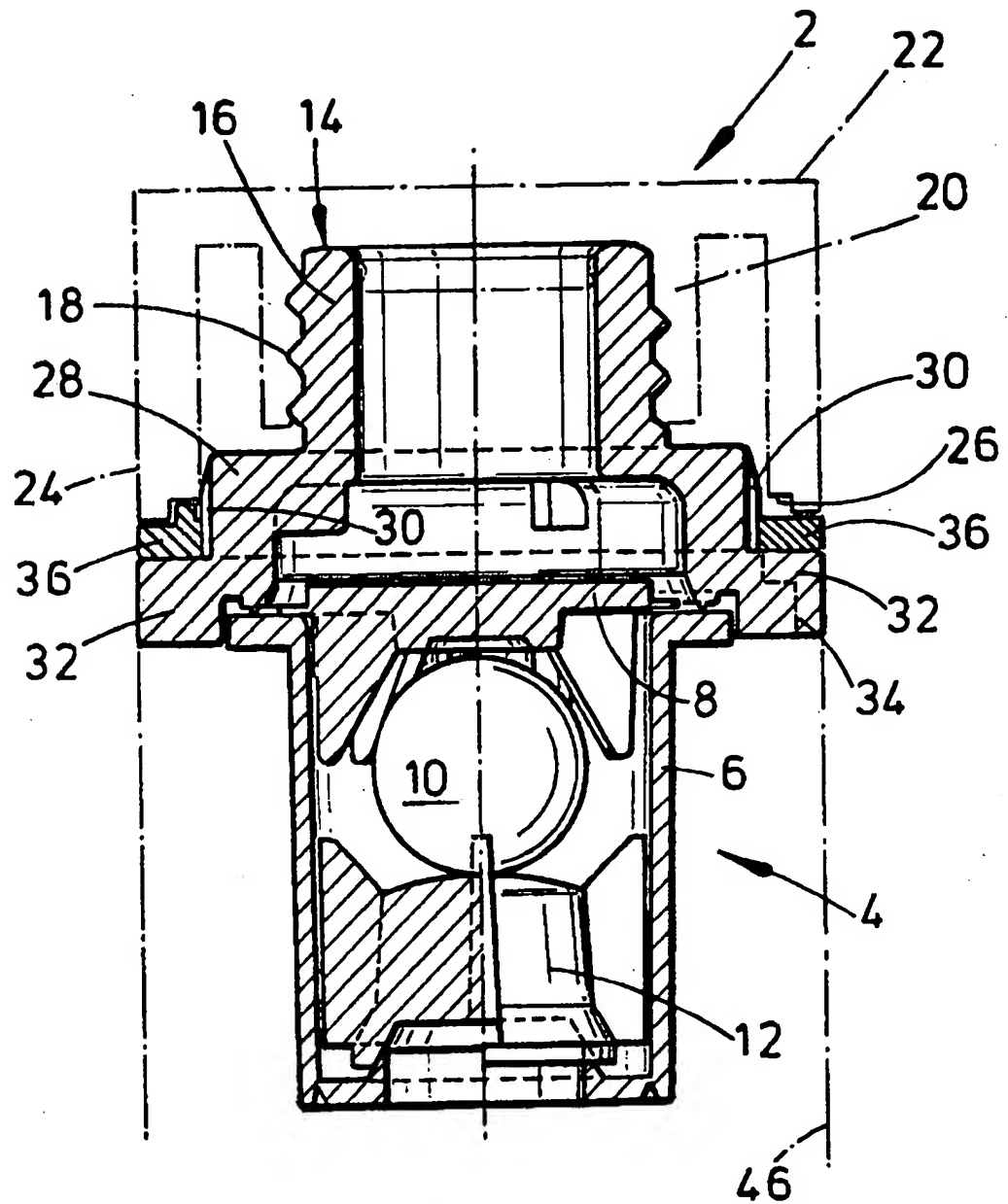
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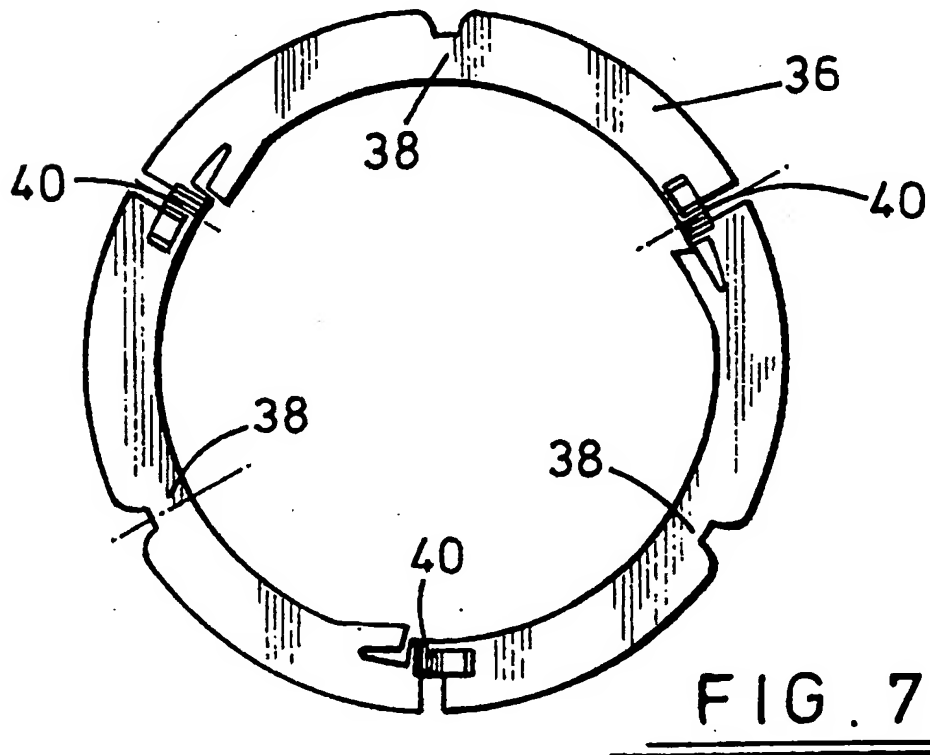
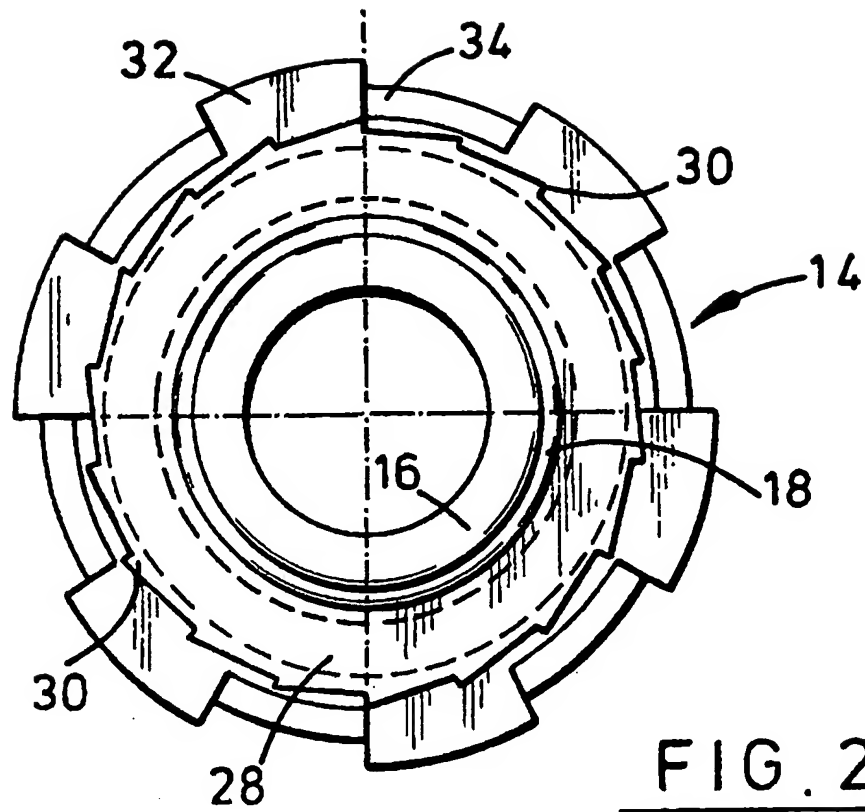
(54) Closure with tamper-indicating device

(57) A tamper-indicating closure assembly, for example for a spirits bottle fitted with a one-way valve, includes a screwthreaded cap 24, a pouring outlet member, and a tamper-indicating ring (36) provided with a plurality of zones 40, 38 of weakness at spaced intervals. On unscrewing of the cap, flexible oblique protrusions 44 on the ring engage means such as ratchet teeth 30 on the outlet member to resist rotation of the ring with the cap and cause selected zones 40 to break. Continued rotation causes radially outward distortion of intervening zones 38 before breaking. The ring may be urged to rotate with the cap by cooperating projections 42 and recesses 26.



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FIG. 1



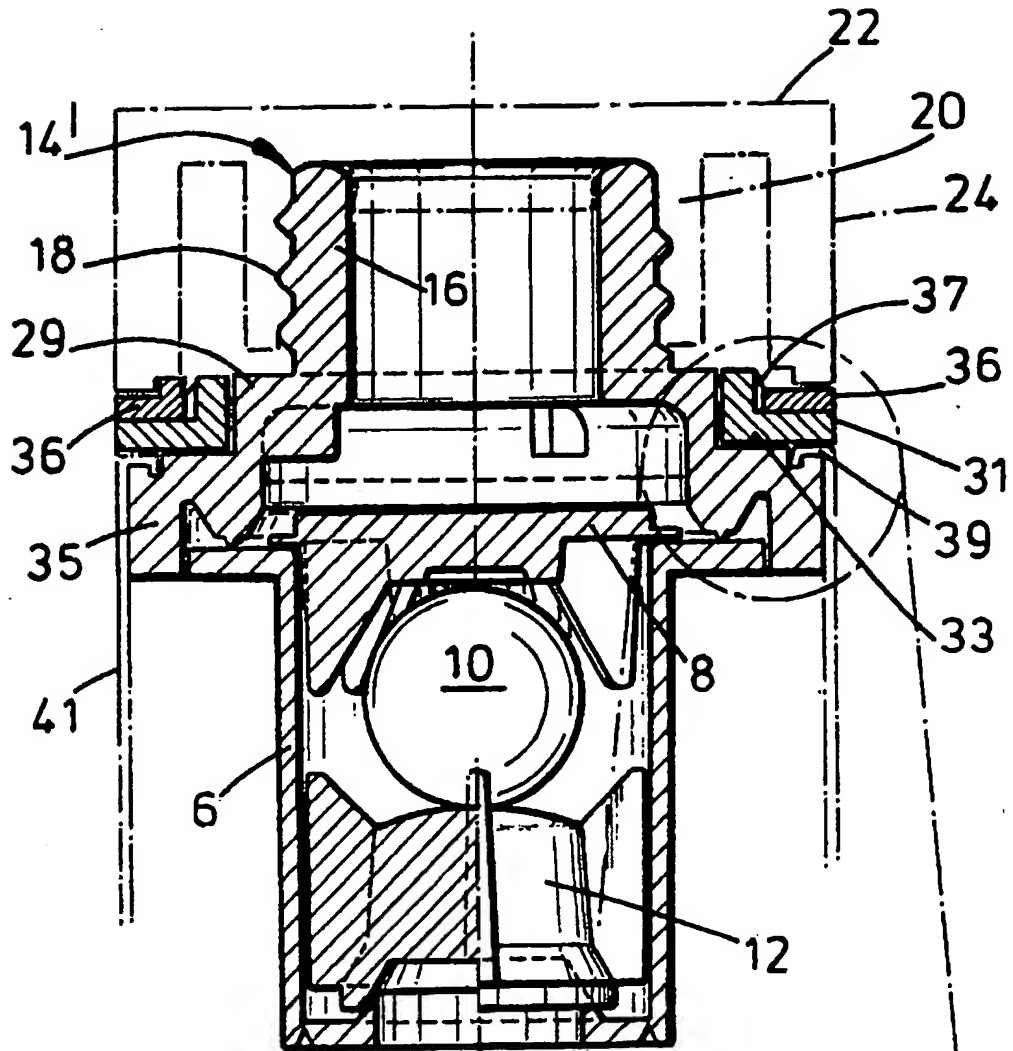


FIG. 3

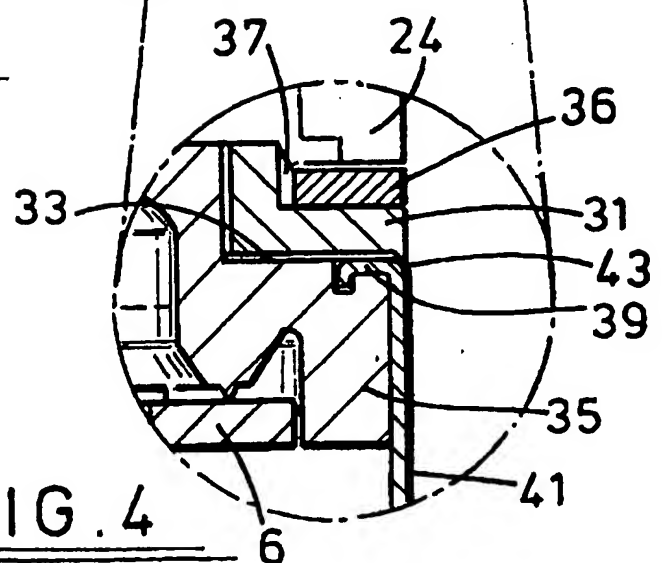


FIG. 4

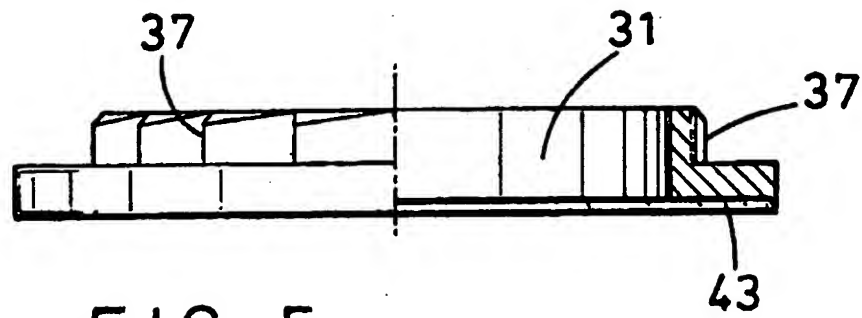


FIG. 5

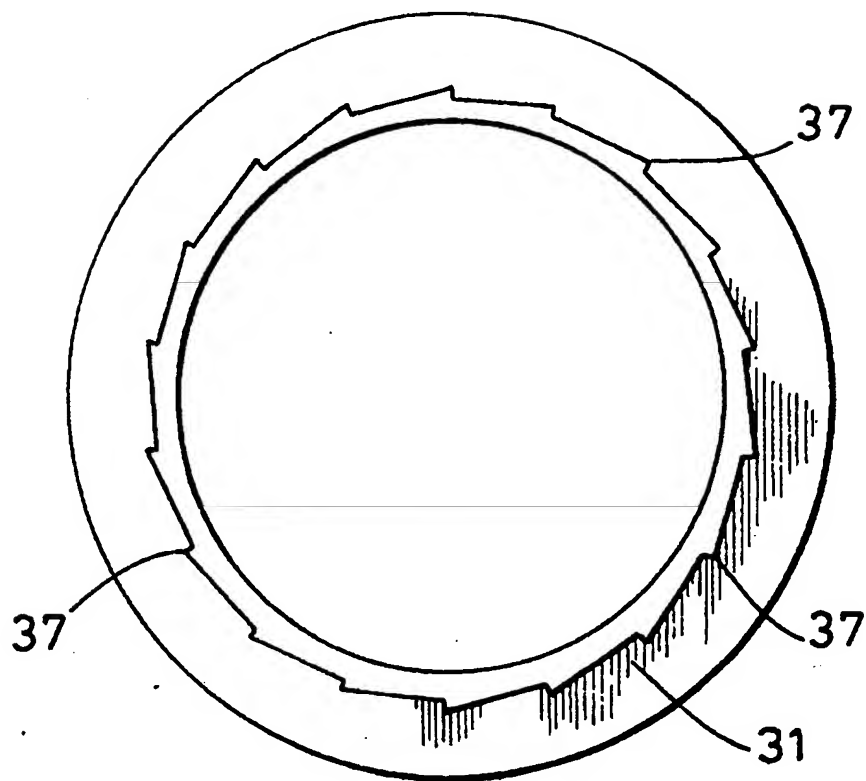


FIG. 6

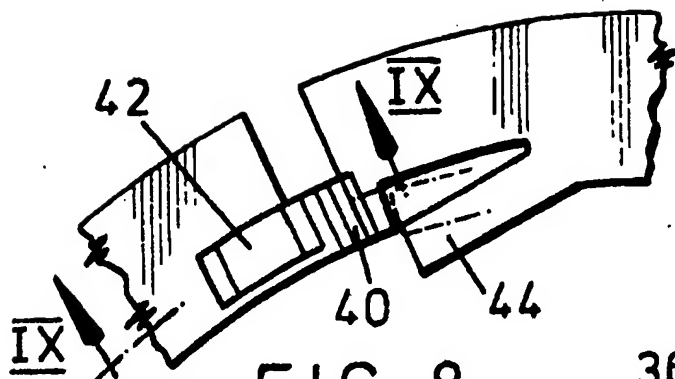


FIG. 8

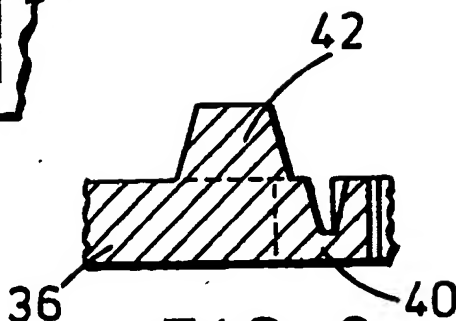


FIG. 9

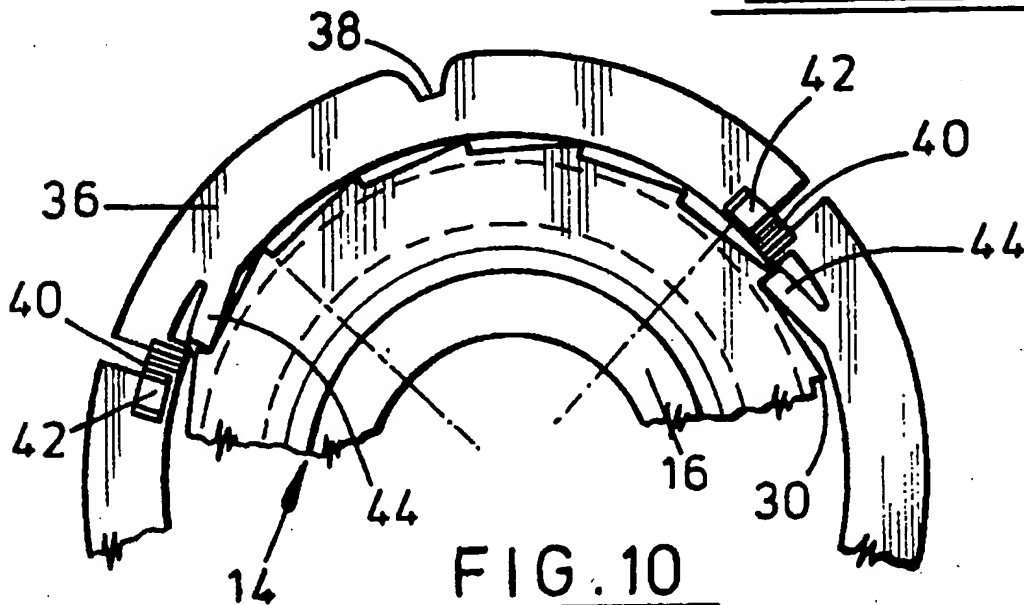


FIG. 10

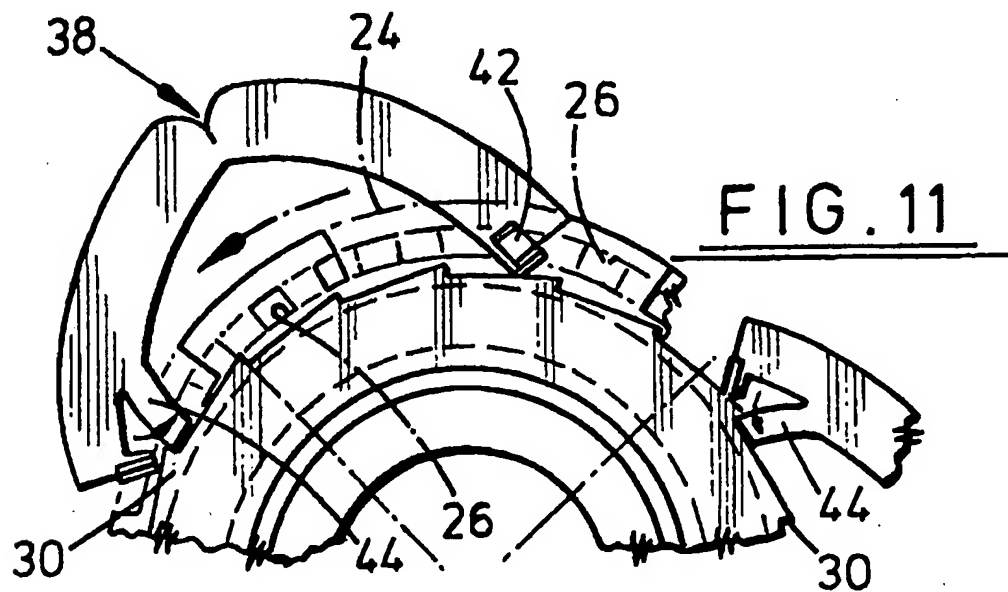


FIG. 11

CLOSURE WITH TAMPER-INDICATING DEVICE

The invention relates to a closure adapted to be applied to the mouth of a container for liquid, for example, the neck of a bottle, and to a tamper-indicating means associated therewith.

For various reasons, it may be desirable to ensure that a used container, such as a bottle intended to contain spirits, is not re-filled with a replacement quantity of liquid, the characteristics and quality of which may differ from the original contents. Attempts to provide closures which make such re-filling difficult are not always proof against determined tampering or pilfering, and it is therefore advantageous to provide a tamper-indicating means which provides evidence that the bottle and its original contents are intact.

The invention therefore provides a closure assembly for use in closing a mouth portion of a container, said closure assembly including an annular tamper-indicating means, a pouring outlet means adapted to surround the mouth portion and a cap adapted to close the outlet member by interengagement of co-operating internal and external screw-threaded portions provided on said cap and said outlet member respectively, said annular tamper-indicating means being interposed between the cap and the pouring outlet means and including zones or lines of weakness at spaced intervals therearound, there being further provided means to urge rotation of said annular tamper-indicating

means with the cap during an unscrewing movement in which the cap partakes of rotational movement relative to the pouring outlet means, and flexible protruding members projecting at an oblique angle inwardly of the annular member so as to be engageable during said unscrewing movement with engagement means on the pouring outlet means in order to provide resistance to said rotation of the annular tamper-indicating means with the cap, the construction and arrangement being such that said resistance to rotation causes selected ones of said zones or lines of weakness to fracture, continued rotational force on the annular tamper-indicating means resulting in intervening zones or lines of weakness becoming distorted so as to protrude radially of the pouring outlet means prior to eventual breaking.

Preferably the engagement means provided on the pouring outlet means may comprise ratchet teeth.

Advantageously, the annular tamper-indicating means may comprise a flat ring of the kind known in this context as a security ring or break ring, said ring being provided with spaced zones or lines of weakness, alternate ones of which are brittle and arranged to break directly in response to rotational force applied to the ring, intervening ones of said zones or lines having limited flexibility so as to hinge or bend prior to breaking.

In an example of a break-ring to be described below in a closure assembly according to the invention, there are



conveniently provided six zones or lines of weakness, three of which are brittle zones or lines which fracture upon being stressed alternating with three zones or lines of limited flexibility enabling arcuate portions of the ring to partake of a hinging action about an axis parallel to the axial centre line thereof, prior to eventual breaking.

There will now be described the above mentioned example of closure assembly in accordance with the invention. It will be appreciated that the description, which is to be read with reference to the drawings, is given by way of example only and not by way of limitation.

In the drawings:-

Figure 1 is a sectional view through a closure assembly according to the invention and including an example of a non-return valve arrangement associated therewith;

Figure 2 is a top plan view of a pouring outlet member of the assembly of claim 1;

Figure 3 is a sectional view through a closure assembly modified by the inclusion of a cowl-securing means associated therewith;

Figure 4 is a fragmentary view of the assembly of Figure 3 to an enlarged scale;

Figure 5 shows a side view of ratchet ring of the assembly of Figure 3, partly in section;

Figure 6 shows the ring of Figure 5 in plan view;

Figure 7 is a plan view of an annular tamper-indicating member of the closure assembly of Figure 1-2 and of Figure 3-4;

Figure 8 is a fragmentary view of a zone of weakness in the member of Figure 7 to an enlarged scale;

Figure 9 is a sectional view taken on line IX-IX of Figure 8;

Figure 10 is a fragmentary plan view of the annular tamper-indicating member in position on the pouring outlet, with a cap of the closure assembly omitted for the sake of clarity; and

Figure 11 is a similar view to that of Figure 10, showing the parts after rotational force is applied thereto.

The closure assembly, indicated generally at 2 in Figure 1, is shown in association with a one-way valve arrangement 4 adapted to deter, hinder or prevent re-filling of a used container, for example of alcoholic drink such as spirits. The valve arrangement 4, which is shown as an example of suitability, comprises a tubular sleeve 6, which is received with a mouth portion of a container (not shown), a retaining and positioning member 8, a ball weight 10 and stopper member 12. The operation of these parts is as described in our co-pending U.K. patent application no. 9017341.0. The arrangement 4 is shown for convenience only and it will be understood that other types of non-refillable fitments may be selected if

preferred.

The closure assembly 2 comprises a pouring outlet member 14 having a pouring lip 16 provided with externally threaded portion 18 engageable with an internally threaded portion 20 of a cap shown in chain-dot lines at 22. The cap 22 has an outer skirt portion 24 provided with a plurality of recesses 26 around a lower edge thereof, the purpose of which will be explained below.

The pouring outlet member 14 as illustrated in Figures 1 and 2 further comprises a first annular shoulder portion 28 having spaced therearound at 20° intervals a series of ratchet teeth 30 and a second annular shoulder portion 32 having recesses 34 which are used as jig location means during factory assembly.

A modified example of a pouring outlet means is illustrated in Figures 3 and 4, in which parts similar to corresponding parts shown in Figures 1 and 2 are designated by the same reference numerals.

In Figures 3 and 4, the outlet means comprises a member 14' having a first annular shoulder portion 29 provided with a smoothly curved peripheral cylindrical surface, the diameter of the portion 29 being such as to enable a ratchet ring member 31 to surround the portion 29 and to be seated upon a radially extending upper surface 33 of a second annular shoulder portion 35. The ratchet ring member 31 which also acts as an anchoring member is shown more clearly in Figures 5 and 6. The ring member is

provided with a series of ratchet teeth 37 similar to the teeth 30 described above.

Received between the ratchet ring member 31 and the second annular shoulder portion 35 are upper marginal portions 39 of a metal cowl member 41 which extends downwardly as shown in Figure 3 to be clenched about the neck portion of a bottle. The upper surface 33 is provided with a groove 43 adapted to receive edges of the marginal portions 39 and is cut back slightly so that no part of the cowl member lies proud of the surface 33. In assembly, the marginal portions are anchored in place beneath the ring 31, which forms the anchoring member mentioned above, by an ultra-sonic welding technique, a smooth outer contour being obtained by the provision of a lip 43 provided on the ring member 31.

Received between the lower edge of the cap skirt portion 24 and either the shoulder 32 of Figures 1 and 2 or the ratchet ring member 31 of Figures 3 and 4 is an annular tamper-indicating means in the form of a flat ring 36. The ring 36 is provided with a plurality of zones or lines of weakness, i.e. with reduced cross section relative to the ring 36 comprising three zones which include linear areas 38 of thin section and three intervening areas 40 of thinnest section. The cross section of the areas 38 is selected to provide a degree of flexibility before breaking, due to the characteristics of the moulded plastics material of which the ring 36 is

composed, and the cross-section of the areas 40 is selected for the latter to be sufficiently brittle as to break without a perceptible amount of flexing.

At one side of the areas 40 of the ring 36 is provided a projection 42, each of which is received in an appropriate one of the recesses 26 of the cap 22. At the opposite side of each of the areas 40 of the ring 36 is provided a flexible protruding member 42 extending generally inwardly of the ring at an oblique angle so as to engage with appropriate ones of the ratchet teeth 30 as shown more clearly in Figure 10 or the ratchet teeth 37 shown in Figure 6.

Referring to Figures 1 and 7 to 11, when the cap 22 is positioned on the pouring outlet member 14 during assembly of the closure components, a clockwise rotary action will cause the cap to be screwed onto the threaded portion 18. Because of the engagement of the projections 42 in three appropriate recesses 26 of the cap 22, the ring 36 will rotate with the cap. This will result in the tongues 44 riding past the ratchet teeth 30 since the tongues are flexible and the oblique angle of direction is arranged to permit clockwise movement, as viewed in the Figures.

Thus the components of the closure shown in Figure 1 may be assembled ready for attaching to a container neck portion by clamping a metal cowl member 46 which extends downwardly as shown in chain dot lines in Figure 1 to be clenched about the neck portion, while the sleeve 6

extends downwardly within the neck portion.

When it is required to open the container, the cap 22 is unscrewed in an anti-clockwise direction. Because of the engagement of the protrusions 42 in three of the recesses 26 of the cap 22, the ring 36 will again be urged to rotate with the cap. However, in the anti-clockwise direction the protrusions 42 but against three appropriate teeth 30 as shown in Figure 6. Continued anti-clockwise movement of the cap causes the zones of weakness 40 to fracture, thus breaking the ring 36 into three arcuate pieces. Each piece of the ring 36 is thus trapped at both ends and begins to hinge at weakness zone 38 as shown in Figure 11. The person opening the container, for example the spirits bottle, has his attention drawn to the breaking of the ring by the presence of the three pieces of the ring 36 temporarily projecting from the cap prior to continued anti-clockwise movement of the cap causing the zones 38 to fracture, resulting in the ring 36 being broken into six pieces. The action of the ring 36 in the context of the parts as shown in Figures 3-6 is identical to that described above.

It will be appreciated that a person who is aware of the operation as described above will be alerted to the occurrence of tampering should the operation fail to occur. Moreover, while the absence of any security ring visible between the cap edges and the cowl normally alerts a person to the fact that the bottle is not unused, the

mere presence of a substitute ring will not deceive that person where the substitute ring does not break in the manner described above.

Various modifications may be made within the scope of the invention as defined by the following claims.

CLAIMS:

1. A closure assembly for use in closing a mouth portion of a container, said closure assembly including an annular tamper-indicating means, a pouring outlet means adapted to surround the mouth portion and a cap adapted to close the outlet member by interengagement of co-operating internal and external screw-threaded portions provided on said cap and said outlet member respectively, said annular tamper-indicating means being interposed between the cap and the pouring outlet means and including zones or lines of weakness at spaced intervals therearound, there being further provided means to urge rotation of said annular tamper-indicating means with the cap during an unscrewing movement in which the cap partakes of rotational movement relative to the pouring outlet means, and flexible protruding members projecting at an oblique angle inwardly of the annular member so as to be engageable during said unscrewing movement with engagement means on the pouring outlet means in order to provide resistance to said rotation of the annular tamper-indicating means with the cap, the construction and arrangement being such that said resistance to rotation causes selected ones of said zones or lines of weakness to fracture, continued rotational force on the annular tamper-indicating means resulting in intervening zones or lines of weakness becoming distorted so as to protrude radially of the pouring outlet means prior to eventual breaking.



2. An assembly as claimed in claim 1, wherein the engagement means provided on the pouring outlet means comprises ratchet teeth.
3. An assembly as claimed in either one of claims 1 and 2, wherein the annular tamper-indicating means is provided with spaced zones or lines of weakness, alternate ones of which are brittle and arranged to break directly in response to rotational force applied to the ring, intervening ones of said zones or lines having limited flexibility so as to hinge or bend prior to breaking.
4. An assembly as claimed in claim 3, wherein there are provided six zones or lines of weakness, three of which are brittle zones or lines which fracture upon being stressed alternating with three zones or lines of limited flexibility enabling arcuate portions of the ring to partake of a hinging action about an axis parallel to the axial centre line thereof, prior to eventual breaking.
5. An assembly as claimed in any one of the preceding claims wherein the pouring outlet means is provided with a one-way valve arrangement adapted to permit outflow of contents of the container.
6. An assembly as claimed in any one of the preceding claims, wherein the pouring outlet means further comprises an anchoring member and there is further provided a cowl member to be anchored in place by the anchoring member, said cowl member being adapted to be clenched about said container when the container is closed.

7. An assembly as claimed in claim 6, wherein the ratchet teeth are provided on the anchoring member of the outlet means.

8. An assembly as claimed in either of claims 6 and 7, wherein upper marginal portions of the cowl member received between the anchoring member and the outlet member, are bonded in place by an ultra-sonic welding technique.

9. A closure assembly for a container substantially as hereinbefore described with reference to an as shown in the drawings.